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A NEW TROGLOBITIC SCORPION OF THE GENUS *TYPHLOCHACTAS* (SUPERSTITIONIDAE) FROM VERACRUZ, MEXICO

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ABSTRACT. A distinctive new troglobitic scorpion of the genus *Typhlochactas* Mitchell from Sótano de Poncho near Municipio Tlaquilpa, Veracruz, Mexico is described and compared to the other members of the genus from the eastern ranges of the Sierra Madre Oriental.

The genera *Superstitionia* Stahnke 1940, *Typhlochactas* Mitchell 1968, *Sotanochactas* Francke 1986, and *Alacran* Francke 1982 comprise what is thought to be a compact monophyletic group. Francke (1982) considered these genera to represent the subfamily Superstitioninae Stahnke 1940, placed *incertae sedis* in the "Chactoidea" (= Chactidae Laurie 1896 + Vaejovidae Thorell 1876 + Iuridae Thorell 1876). Subsequently, he placed it in the Chactidae (Francke 1985), and that status was retained by Sissom (1988, 1990). Stockwell (1992) elevated this subfamily to the familial level and suggested a closer relationship to the Vaejovidae and Iuridae than to the Chactidae. He also added two additional genera, the endogean *Belisarius* Simon 1879 from the Pyrenees Mountains in France and Spain and the troglobitic *Troglotayosicus* Lourenço 1981 from Ecuador, into the Superstitionidae without evidence of "definitive association". While we tentatively agree with the recognition of the Superstitionidae as a valid family (on the basis of Francke's 1982 diagnosis of the subfamily), we express reservations on the inclusion of *Belisarius* and *Troglotayosicus* into the family without firm evidence.

The genus *Typhlochactas* consists of five species in eastern and southern Mexico (Mitchell 1968; Mitchell & Peck 1977; Francke 1986; Sissom 1988). Three of these species (*T. rhodesi* Mitchell 1968, *T. reddelli* Mitchell 1968, and *T. cavicola* Francke 1986) are troglobites, and two (*T. sylvestris* Mitchell & Peck 1977 and *T. mitchelli* Sissom 1988) are known from forest litter in the mountains of Oaxaca. All are small, eyeless forms with greatly reduced pigmentation. It is the purpose here to describe another troglobitic species of this genus that was recently collected from a cave in northeastern Veracruz, Mexico.

With the transfer of *T. elliotti* Mitchell 1971 into the genus *Sotanochactas* by Francke (1982) and inclusion of several new species since that time, the diagnosis for the genus requires emendation. Francke's (1982) diagnosis for the subfamily Superstitioninae will serve as a proper diagnosis for the family Superstitionidae. The two tribes, Superstitionini and Typhlochactini, should be elevated to subfamilies and may also be diagnosed by Francke's characters.

Typhlochactas Mitchell 1968

Typhlochactas Mitchell 1968: 754–756 (original description); Mitchell 1971: 238 (part); Vachon 1974: 914, 923; Soleglad 1976: 253–254; Mitchell & Peck 1977: 164–165 (part; revised diagnosis); Francke 1985: 14, 16, 20; Francke 1986: 8; Sissom 1900: 109, 114; Stockwell 1992: 410, 412 (key), 419, fig. 3, 28, 30, 33, 35.

Typlochactas (sic): Díaz Najera 1975: 3.

Diagnosis.—Typhlochactinae with color pale yellowish to whitish; sclerotization weak; caudal segments with carination reduced; cheliceral fixed finger with two basalmost teeth either separate or forming a bicusp; cheliceral movable finger with either three, four, or five dorsal teeth; prolateral pedal spurs present or absent; tarsi armed ventrally with two submedian, somewhat irregular rows of setose bristles; pedipalp patella with tricho-

bothrium v_2 displaced to external face; pedipalp chela fixed finger about as long as or slightly longer than chela palm; chela trichobothria as follows: *ib* and *it* situated near base of fixed finger, *eb* (basalmost of the external series) at extreme base of finger; pedipalp chela fixed finger with four to seven oblique rows of denticles along cutting margin.

Type species.—By subsequent designation (Mitchell & Peck 1977) *Typhlochactas rhodesi* Mitchell 1968.

Typhlochactas granulosus new species (Figs. 1–11)

Type data.—Holotype male taken from Sótano de Poncho, Municipio Tlaquilpa, Veracruz, Mexico on 22 March 1995 by P. Sprouse; deposited in the American Museum of Natural History, New York.

Etymology.—The specific epithet is derived from the Latin *granum* (meaning "small grain") with the suffix *-osus* (meaning "full of") and refers to the stronger granulation of this species in comparison to its congeners.

Distribution.—Known only from the type locality.

Diagnosis.—Adult male 17.3 mm long. Carapace, tergites, and metasoma sparsely to moderately finely granular; pedipalpal segments, particularly the chela, moderately coarsely granular. Metasomal segment V 1.29 times longer than carapace and about 3.53 times longer than wide. Cheliceral fixed finger with four teeth; basal and medial teeth combined into a compound tooth. Movable finger with four dorsal teeth. Pedipalp chela relatively slender with movable length/chela width ratio 3.05; both chela fingers distinctly longer than carapace; fixed finger of chela with seven slightly oblique rows of granules on dentate margin, with basalmost row shortest; movable finger with seven rows. Legs without pedal spurs; ventral aspect of tarsomere II lacking median row of fine spinules.

Typhlochactas granulosus is most similar to *T. rhodesi* and *T. reddelli*. Both *T. rhodesi* and *T. reddelli* are known only from females, but *T. granulosus* is readily distinguished from them on the basis of several nonsexual characters. *Typhlochactas granulosus* differs from *T. rhodesi* by having seven granular rows on both pedipalpal chela fingers (rather than six rows on each), by having a distinct basal bicusp on the cheliceral fixed finger (not with the basal teeth separate), and by having only four teeth on the cheliceral movable finger (rather than five).

The species may be distinguished from *T. reddelli* by having seven granular rows on the pedipalpal chela fixed finger (rather than six), with the apical row short (rather than long); by having four teeth on the cheliceral movable finger (rather than five); and by lacking pedal spurs. Additional comparisons of *T. granulosus* with these and other *Typhlochactas* appear in Table 1.

Description.—Based on adult male (Fig. 1), the only known specimen.

Coloration: Body uniformly very pale yellow brown. Legs and proximal pedipalpal segments paler than body; pectines whitish. Dentate margins of pedipalp fingers, cheliceral teeth, and aculeus brownish.

Prosoma: Carapace subquadrate; length equal to posterior width. Surface evenly, finely granular with a few small setae. Anterior margin straight with subtle rounded medial projection. Median longitudinal furrow present, shallow. Median and lateral eyes absent. Sternum as in Fig. 2, with anterior width slightly greater than median length; anterior margin gently convex, posterior margin concave, lateral margins diverging distally; small posteromedial depression present; with two pairs of setae.

Mesosoma: Tergites I–VII, acarinate; pretergites smooth, post-tergites densely, finely granular. Genital operculum (Fig. 2) subelliptical, completely divided longitudinally; genital papillae present. Pectines (Fig. 2) with 5/4 teeth; each with two marginal lamellae and one middle lamella; distal fourth of each pectinal tooth with conspicuous, dense, peg sensillae. Sternites III–VII feebly punctate, sparsely setose; stigmata small, elliptical.

Metasoma: Segment I slightly wider than long, II and III distinctly longer than wide, segment V 3.53 times longer than wide. Segments I–IV: Essentially acarinate, but with dorsolateral areas feebly elevated and granular. Dorsal and lateral surfaces with moderately dense, fine granulation; ventral surfaces of I–III smooth and of IV sparsely granular. Setation of first four segments as follows (setal pairs): dorsolateral setae, 1:1:1:1; lateral setae, 1:1:1:2; ventrolateral setae, 1:2:2:2; ventral submedian setae, 2:2:2/3:3. Segment V 1.29 times longer than carapace; carinae indistinct,

Table 1.—Summary of morphological and morphometric differences in the six species of *Typhlochactas.* Morphometric comparisons of *T. granulosus* with *T. rhodesi* and *T. reddelli* should be interpreted with caution, as the latter are known only from females. Morphometric ratios are calculated from original sources; those given for *T. mitchelli* represent the average of the holotype and paratype males. Abbreviations are as follows: *cav = T. cavicola, gra = T. granulosus, red = T. reddelli, rho = T. rhodesi, syl = T. sylvestris, mit = T. mitchelli,* L = length, W = width, M = male, F = female. Note: Mitchell (1968) and Mitchell and Peck (1977) listed a measurement for femur depth, but this is probably the same as width as reported by other authors; their measurements are indicated by "*".

Character	*cav* (M)	*gra* (M)	*red* (F)	*rho* (F)	*syl* (F)	*mit* (M)
Basal teeth of cheliceral fixed finger fused into bicusp	no	yes	weakly	no	no	no
Number of teeth on cheliceral fixed finger	4	4	4	4	3	3
Number of dorsal teeth on cheliceral movable finger	4	4	5	5	4	3
Number of granular rows on pedipalp chela fixed finger	6	7	6	6	5	4
Number of granular rows on pedipalp chela movable finger	5	7	7	6	6	5
Granulation of pedipalps	minor	extensive	minor	minor	minor	moderate
Prolateral pedal spurs	absent	absent	present	absent	present	present
Metasomal segment II L/W	0.80	1.29	0.89	0.77	0.57	0.75
Metasomal segment V L/W	2.11	3.53	2.58	2.42	1.78	1.84
Pedipalp femur L/W	2.92	3.75	2.76*	3.49*	2.22*	2.46
Pedipalp chela L/W	3.75	4.89	3.78	3.92	3.00	3.06
Chela movable finger L/chela W	2.20	3.05	2.23	2.46	1.64	1.76

but angles separating faces irregularly granular; all surfaces coarsely granular. Paired setae of segment V: 2 dorsolaterals, 3 laterals, 3 ventrolaterals, and 3/4 ventrals. Sum of metasomal I–V lengths 3.66 times greater than carapace length.

Telson: Vesicle flattened dorsally, moderately globose ventrally (vesicle length/depth = 2.00); telson almost as wide as first metasomal segment, wider than segments II–V. Lateral and ventral aspects of vesicle with irregular granulation; moderately setose. Aculeus very slender and gently curved; junction of aculeus and vesicle well-marked.

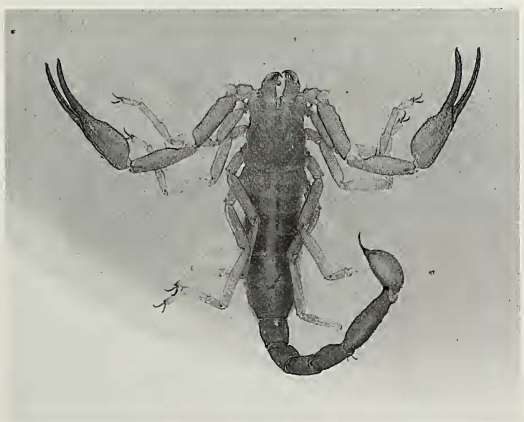
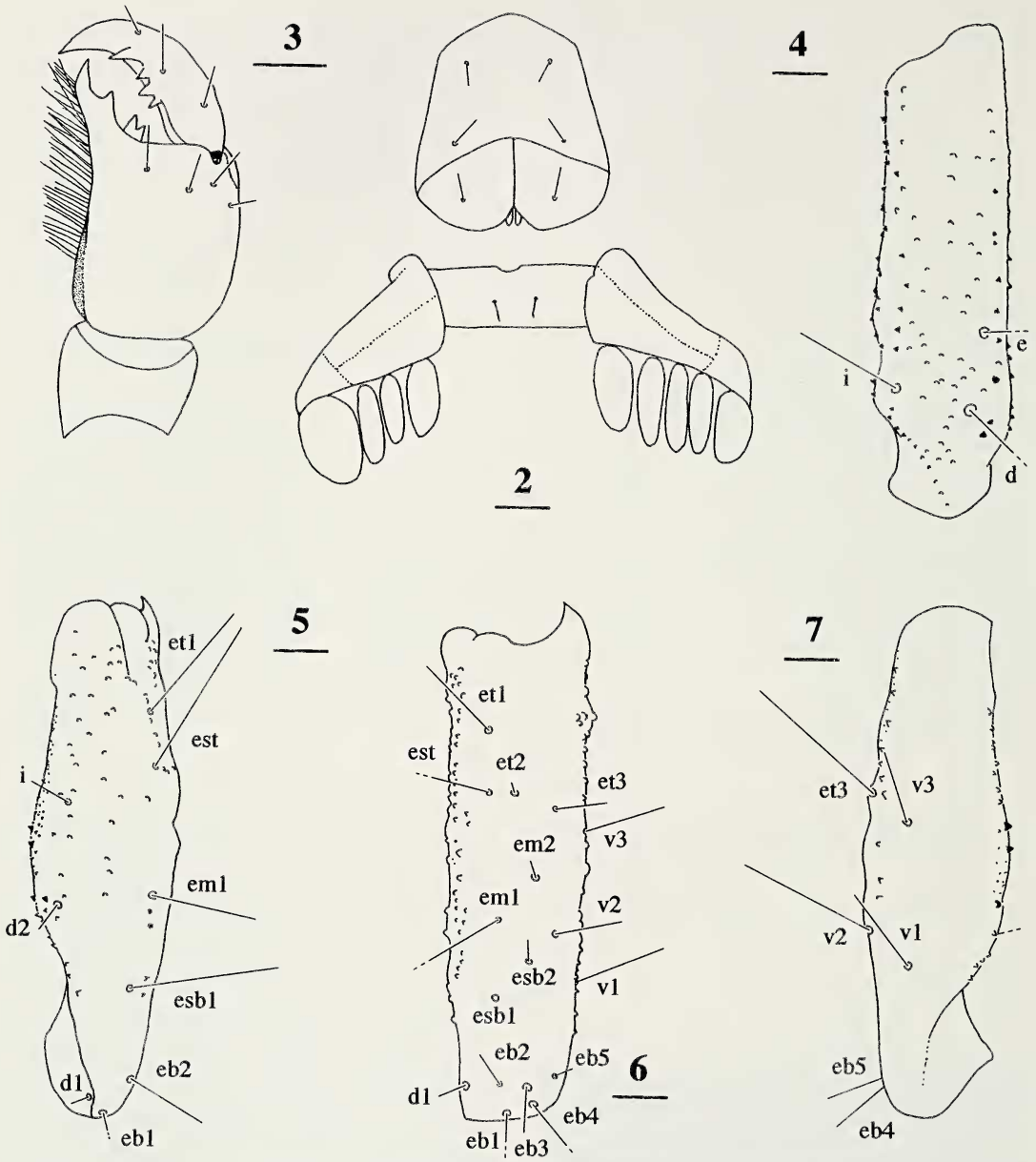


Figure 1.—Photograph showing dorsal view of holotype male of ***Typhlochactas granulosus*** new species.

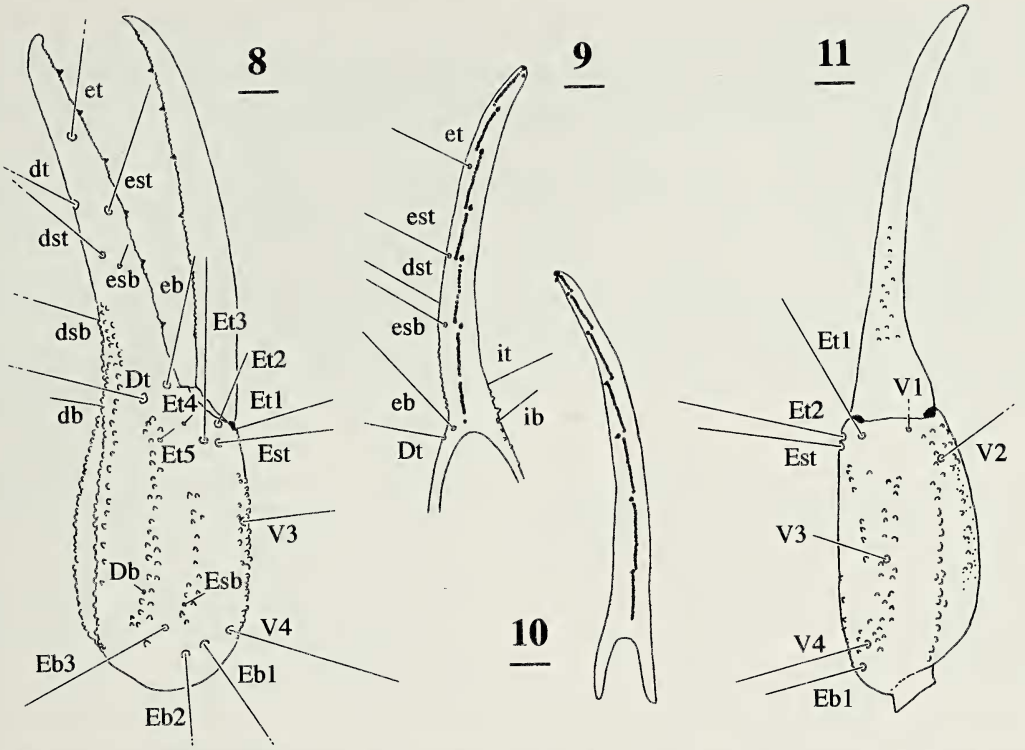
Chelicerae: Fixed finger (Fig. 3) with four teeth (distal, median, and a basal bicusp). Movable finger (Fig. 3) with four teeth: distal internal tooth large, distinctly separated from others; distal external, subdistal, medial, and basal teeth situated close together at midfinger; medial tooth slightly larger than subdistal and basal teeth. Distinct serrula present on ventrodistal half of movable finger. Dense array of long, thin setae present on medial and ventral surfaces of fixed finger; a few longer hairlike setae situated on ventral aspect of movable finger (proximal to serrula).

Pedipalps: Femur (Fig. 4) 3.75 times longer than wide, with carinae essentially obsolete. All surfaces moderately, coarsely granular. Femur orthobothriotaxic, Type C (Vachon 1974). Patella (Figs. 5–7) 3.61 times longer than



Figures 2–7.—External morphology of holotype male of ***Typhlochactas granulosus*** new species. 2, Ventral aspect of sternum, genital opercula, and pectines; 3, Dorsal aspect of right chelicera; 4, Dorsal aspect of pedipalp femur; 5, Dorsal aspect of pedipalp patella; 6, External aspect of pedipalp patella; 7, Ventral aspect of pedipalp patella.

wide, with carinae essentially obsolete; dorsal, external, and ventral surfaces moderately, coarsely granular; basal tubercle obsolete. Patella orthobothriotaxic, Type C (Vachon 1974); trichobothria d_1 and d_2 short, but pits not distinctly reduced; trichobothrium v_2 located on external aspect (Fig. 6). Chela (Figs. 8–11): manus slightly swollen, with palm length/chela width ratio of 2.11; ratio of movable finger length/chela width, 3.06. Dorsal marginal, dorsal secondary, digital, and external secondary carinae represented by irregular rows of coarse granules; dorsointernal and ventrointernal carinae represented by series of smaller granules; carinae of ventral surface obscured by dense granulation. Fixed finger



Figures 8–11.—Pedipalp chela morphology of ***Typhlochactas granulosus*** new species. 8, External aspect of pedipalp chela; 9, Inner margin of pedipalp chela fixed finger, showing placement of trichobothria and dentition; 10, Inner margin of pedipalp chela movable finger, showing dentition; 11, Ventral aspect of pedipalp chela.

(Fig. 9) granular basally along dorsum, with seven slightly oblique rows of denticles from apex to base; basal row shortest; six inner accessory granules, these paired with terminal denticle and enlarged denticles of all but the basalmost row. Movable finger (Fig. 10) with seven slightly oblique rows of denticles; distalmost and basalmost rows shortest; seven inner accessory granules paired with the terminal denticle and enlarged denticles of the denticle rows. Movable finger 1.45 times longer than palm; fixed finger length/carapace length ratio of 1.12. Orthobothriotaxic, Type C (Vachon 1974); trichobothria *ib* and *it* situated just distal to junction of fixed finger and manus (Fig. 9); trichobothria *Db, Esb,* Et_4, Et_5, V_1, and *esb* petite (Fig. 8).

Legs: Tibial and pedal spurs lacking. Ventral aspect of tarsomere II with four or five setae on the prolateral side and four or five on the retrolateral side (irregularly paired); median spinule row absent. Unguis moderately long and curved; dactyl well developed.

Measurements (mm): Total L, 17.30; carapace L, 2.05; mesosoma L, 5.30; metasoma L, 7.50; telson L, 2.45. Metasomal segments: I L/W, 0.95/1.00; II L/W, 1.10/0.85; III L/W, 1.20/0.80; IV L/W, 1.60/0.75; V L/W, 2.65/0.75. Telson: vesicle L/W/D, 1.60/0.95/0.80; aculeus L, 0.85. Pedipalps: femur L/W, 2.25/0.60; patella L/W, 2.35/0.65; chela L/W/D, 4.40/0.90/1.15; fixed finger L, 2.30; movable finger L, 2.75; palm (underhand) L, 1.90.

Comments—In the vial with the holotype was a large, pigmented pedipalp chela that structurally resembles the chela of *Alacran tartarus* Francke 1982, known only from deep caves of the Sistema Huautla, Oaxaca. This chela obviously represents a significant finding, but until more material becomes available it will not be possible to draw comparisons with the Oaxacan specimens. This partial specimen represents the only other scorpion known from the Sotano de Poncho.

According to Peter Sprouse (pers. comm.), Sotano de Poncho is 95 m long and 73 m deep. Mr. Sprouse provides the following description of the cave: "The entrance pit is less

than 2 meters across, but widens as it goes down. This shaft is 53 meters deep, broken by a ledge about halfway down. The talus slope at the bottom leads into a narrow rift to the top of the second drop. This drops 8 meters into a meandering rift. This gradually becomes smaller until it is impassable at a depth of 73 meters. . . The trend of this cave is similar to nearby Sotano del Hombre Miedoso, and could conceivably be related." The holotype of *T. granulosus* was collected on the talus slope at the base of the entrance drop, and the large chela was found in the same area of the cave.

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